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time, disintegrate. There are also diamonds of all colors and qualities which are found in the mines in a broken state. These are not cases of fracture in mining, whether by the use of explosives or otherwise. The fragments are embedded in the matrix and the crystals have been broken before final consolidation of the lava took place. They seem precisely analogous to the broken phenocrysts of hornblende or feldspar not infrequently found in lavas and such as Lewis found in kimberlite; it is asserted that in a solitary case two complementary portions of a single diamond have been found, one of them coming from a depth of two hundred feet greater than the other.*

Mr. Kunz inclines to ascribe the fracturing of diamonds to the brecciation of the lava. If this were the correct explanation one would expect to find the diamond fragments only at the surfaces of rock fragments, and to hear of complementary portions of diamond crystals found near together. The few specimens of still embedded fragments which I had an opportunity of inspecting did not bear out the theory of brecciation fracture, and I have noted above the only instance I could learn of in which complementary fragments have been discovered. It seems to me more probable that the diamonds and other fractured phenocrysts in massive lavas have been broken at the moment of explosive ejection from the volcanic melting-hearth.

I am not in a position to discuss Sir Henry Roscoe's discovery of a soluble hydrocarbon in the blue, for I do not know whether the massive lava free from shale, in the deeper workings, does or does not contain it. If it does, the origin of this substance would probably be most easily explained as similar to that of the crystallized carbon, and as due to some such process as that to which Mr. Mendeleeff ascribes the formation of the Baku petroleum, the decomposition of carboniferous, terrestrial, metallic iron.

In closing this criticism it is appropriate to quote the opinion of Mr. Gardner F. Williams,†

* E. J. Loomis, Eclipse party in South Africa, 1896, p. 121.

† Second annual report of the De Beers consolidated mines for the year ending March 31, 1890. In this

a mining engineer who for many years has managed the De Beers consolidated mines with conspicuous ability. "The proofs are most conclusive that the diamonds were not formed *in situ*, but have come up from below with the blue ground."

GEORGE F. BECKER. †

WASHINGTON, D. C., October, 1897.

NOTE ON 'THE EASTERNMOST VOLCANOES OF THE UNITED STATES.'

IN a letter published in SCIENCE (Vol. VI., No. 146, pp. 594-595, October 15, 1897) Mr. Robert T. Hill tries to correct the map showing the distribution of volcanoes in the United States, plate 5, published in 'Professor I. C. Russell's magnificent volume on the *Volcanoes of North America*.' He says the "conclusions on the part of Professor Russell are erroneous and mar his otherwise excellent work, for some of the most beautiful and perfect volcanic craters in the United States occur in New Mexico." Consequently Mr. Hill gives a sketch of the New Mexican region, giving 'supplementary data concerning the distribution of volcanic phenomena.' Among the omissions of the true craters of New Mexico, which have escaped Mr. Russell's notice, the groups of volcanic cones and craters with flows of lava, called the Cerro, lying between Galisteo and the Rio Grande are quoted in the letter, but erroneously marked in the accompanying sketch as forming a line of three black discs or craters at the western

report Mr. Williams quotes Stelzner as having determined the 'snake dike' as pikrite porphyry and the blue ground as essentially the same rock. The melaphyre sheet underlying the bituminous shale Stelzner considered as olivine diabase. Mr. Williams probably took these determinations from letters, for I can find no publication by Stelzner on the subject until 1893 (Isis Society, Dresden). In this paper Stelzner adopted Lewis' term 'kimberlite' for the blue ground. He assented to Knop's view, that the kimberlite magma was itself carboniferous or hydrocarboniferous and that the diamond crystallized out as a primitive rock constituent. He mentioned, as of special bearing on this subject, a specimen presented by Mr. Williams to the Freiberg Museum, a fragment of diamond which is intergrown with pyrope and is thus presumably from the same habitat as this essential element of the kimberlite.

foot of that part of the Cordilleran mountain series called Sierra de Sandia and bordering exactly the Rio Grande del Norte; just where is situated the town of Albuquerque and the villages of Alameda, Sandia and Bernalillo.

Such erroneous volcanic geography has never been given in a map of the United States even on the most rough sketch.

The group of craters of the Cerrito was first discovered by the present writer in 1853, and recorded as such, on the geological map of New Mexico, 1857, published in Zurich, Switzerland, in *Geology of North America*. They occupy a part of the mesa existing between the southern system of the Cordillera called the Santa Fé Mountains and the northern end of the Sierra de Sandia, nearer to the city of Santa Fé than of Albuquerque, and close to the railroad station called Lamy. The Cerrito lie between Galisteo, Cieneguilla and Lamy. On the sketch map of Mr. Hill, the crater of the old volcano called Cerrito ought to be placed just near the head waters of the Rio Pecos, a little south of the Santa Fé Mountains and northeast of the Sierra de Sandia; and the three black discs of Albuquerque, Sandia and Bernalillo, on the eastern side of the Rio Grande, scratched out.

JULES MARCOU.

GLACIAL STRIÆ.

TO THE EDITOR OF SCIENCE: While strolling over the low hills adjacent to the Delaware river in Northampton county, Pa., I found unmistakable glacial striæ, at least four miles south of the front of the terminal moraine, as commonly defined.

Three parallel scratches, with traces of a fourth, on the sloping side of a shelf of limestone that had just been uncovered from under what seemed a slight bed of true till, and with a direction S. 20 W., made a mistake of judgment, it seems to me, impossible. The repeated occurrence of such ice traces throughout this county to a distance of at least twenty miles south of the moraine most certainly opens for investigation the question of the southern limit of glacial ice.

Yours,

ALBERT G. RAU.

BETHLEHEM, September 15, 1897.

THE ALLEGED EXTINCTION OF LINES OF DESCENT.

PROFESSOR W. K. BROOKS contributed to this JOURNAL some time since (February 1, 1895) an interesting article entitled 'An Inherent Error in the Views of Galton and Weismann on Variation.' The argument of this paper was based on the alleged necessary extinction of lines of descent. Thus Professor Brooks writes:

"Of all the individuals of a species which lived at a given period, very few would have descendants at a later period." "Most of the individuals in each generation must fail to perpetuate their lines to remote descendants." "If a city like Baltimore, where the strangers to each one of us outnumber our acquaintances a thousand fold, could be quarantined against people from outside for a thousand years, each generation would be like the present one so far as known relations are concerned, although at the end of the period the inhabitants would certainly not be descended from the Baltimoreans of our day, but from only a very few of them. Most of our lines would be extinct."

I return to the subject because Professor Brooks' statements carry great weight in a subject important for theories of heredity and evolution, and it seems to me that they contain 'an inherent error.' Family names will become extinct, as shown by Mr. Galton, but not lines of descent that have persisted for several generations. If the present population of Baltimore is to remain stationary, some of the inhabitants having no offspring, the others must on the average have more than two. If, for example, we simplify the problem by supposing one-half of the population to be sterile, and each of those who are fertile to have four offspring who survive to maturity, then only one-sixteenth of the fertile parents would have no descendants in the third generation. Of the balance only one line in 256 would become extinct in the fourth generation, one in 65,536 in the fifth, and one in 4,294,967,296 in the sixth. With families of variable size, etc., the calculations would become intolerably complex; but in any population not decreasing in numbers the descendants of each individual tend to increase in a geometrical ratio and cannot become extinct after several generations. If King Alfred and King Alfred's barber had lines of descent lasting several generations, we are each